Abstract of the Disclosure

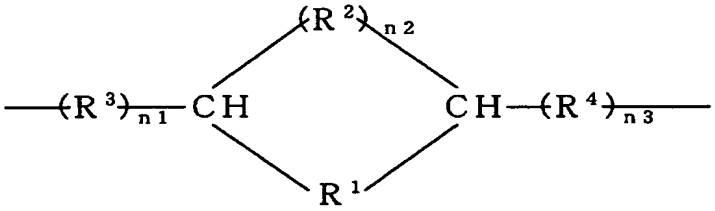
There is provided a fluorine-containing copolymer having an aliphatic monocyclic structure in the polymer trunk chain which has a number average molecular weight of from 500 to 1,000,000 and is represented by the formula (Ma):

$$-(M1)-(M2a)-(N)- \qquad (Ma)$$

in which

the structural unit M1 is a structural unit derived from an ethylenic monomer having 2 or 3 carbon atoms and at least one fluorine atom,

the structural unit M2a is at least one structural unit which introduces an aliphatic monocyclic structure in the polymer trunk chain and is represented by the formula (a):



(a)

wherein R^1 is at least one hydrocarbon group selected from the group consisting of a divalent hydrocarbon group having 1 to 8 carbon atoms and constituting a ring which may be further substituted with a hydrocarbon group or a fluorine-containing alkyl group and a divalent hydrocarbon group having ether bond which has the sum of carbon atoms and oxygen atoms of 2 to 8, constitutes a ring and may be further substituted with a hydrocarbon group or a fluorine-containing alkyl

group; R^2 is an alkylene group which has 1 to 3 carbon atoms and constitutes a ring; R^3 and R^4 are the same or different and each is a divalent alkylene group which has 1 or 2 carbon atoms and constitutes a ring; n1, n2 and n3 are the same or different and each is 0 or 1,

the structural unit N is a structural unit derived from a monomer copolymerizable with the monomers to introduce the structural units M1 and M2a, and

the structural units M1, M2a and N are contained in amounts of from 1 to 99 % by mole, from 1 to 99 % by mole and from 0 to 98 % by mole, respectively. The fluorine-containing polymer possesses excellent dry etching resistance and transparency in a vacuum ultraviolet region.